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formulating a corrosion speed of a metallic material under an atmospheric condition as a function of environmental assessment points which represent a level of harmfulness of said atmospheric condition; and

diagnosing a life span of said metallic material based upon said corrosion speed calculated by using said function.

REMARKS

Favorable reconsideration of this application, as presently amended and in light of the following discussion, is respectfully requested.

Claims 1-37 are presently active in this case. Claims 1 and 2 have been amended by way of the present amendment.

In the outstanding Office Action, Claims 1-4, 6-9, 13, 17-23, 28-31, 36, and 37 were rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 4,866,393 to Iwai et al in view of U.S. Patent No. 5,221,893 to Kondou et al. Claims 5, 10-12, 14-16, 24-27, and 32-35 were objected to as being dependent upon a rejected base claim, but were indicated as being allowable if rewritten in independent form.

Applicants acknowledge with appreciation the indication that the above-noted claims would be allowable if rewritten in independent form. However, since Applicants believe themselves entitled to the scope of protection stated in Claims 1, 2, 19 and 36, the above-noted dependent claims have presently been maintained in dependent form.

Briefly recapitulating, the present invention (Claim 1) is directed to a deterioration diagnosis method. The method includes the steps of formulating a corrosion loss of a metallic material to exposure days under an atmospheric condition as a function of ~~environmental assessment points which represent a level of harmfulness of the atmospheric~~ condition; and diagnosing a life span of the metallic material based upon the corrosion loss calculated by the function. By way of non-limiting examples, the environmental factors

which are measured include temperature, humidity, corrosive gases and sea salt particles. As illustrated in Figure 2, each environmental factor is classified and determination of environmental assessment points is performed for each environmental factor. The bases for classification and assessment points are the measured values of each environmental factor of several hundred different locations in the Japanese homeland and the results of investigating the corrosion of metallic materials exposed in those environments. Environmental assessment points that take into consideration all the environmental factors of atmospheric environments can be found by finding and totaling the assessment points for each separate environmental factor of those environments, and the corrosivity of the atmospheric environments can be objectively judged by the numerical values of the environmental assessment points. As a result, it is possible to diagnose with good accuracy the corrosivity of metallic materials.¹

Likewise, the present invention (Claim 2) formulates a corrosion speed as a function of environmental assessment points and diagnoses a life span of the metallic material based on that function.

The present invention is also directed to deterioration diagnosis equipment. Claim 19 defines, among other things, a first database for storing a function giving a relationship to an amount of each environmental factor and assessment points for each factor, a second database for storing functions giving relationships between environmental assessment points and assessment points for each factor for each type of metallic material, and an environmental assessment points calculation unit for calculating environmental assessment points.

Likewise, the present invention (Claim 36) provides a deterioration diagnosis equipment including a contamination level measurement unit, a deterioration index database, and a deterioration index calculation unit.

¹ Specification, page 27, line 10 to page 28, line 16.

The Iwai et al patent is directed to a method for diagnosing the deterioration of a zinc oxide type lightning arrester having one or more series connected non-linear resistance elements. Column 1, lines 34-37 state that non-linear resistance elements may deteriorate due to thermal cycles. However, the Iwai et al patent does not disclose or suggest formulating a corrosion loss (speed) of a metallic material as a function of environmental assessment points which represent a level of harmfulness of an atmospheric condition. That is, Iwai et al merely diagnoses the deterioration of a lightning arrester which deteriorated as a function of thermal conditions. No other environmental factors are considered when making the diagnosis.

Furthermore, as conceded in the Office Action, the Iwai et al patent does not disclose or suggest diagnosing a life span of a metallic material based on a formulated corrosion loss (speed). However, the Official Action asserts on page 3 that "it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Iwai to have the diagnose the life span of the metal on corrosion speed on graphical output results taught by Kondou in order to calculate the useful life of the affected material." Applicants respectfully traverse that assertion. Applicants first point out that Kondou et al fail to disclose or suggest diagnosing a life span of the metallic material based upon corrosion loss (speed) using a function of environmental assessment points. That is, Kondou et al fail to address the deficiencies of the Iwai et al patent. Moreover, one of ordinary skill in the art at the time the invention was made would not have been motivated to modify the method disclosed in Iwai et al to include the step of diagnosing a life span of a metallic material because the Iwai et al patent teaches that "it is desirable to provide a method of continuously monitoring the resistance currents during the operation of the arrester assembly in order to determine the initial deterioration of the non-linear resistance elements." Hence, a diagnoses of the life span of the non-linear resistance elements is unnecessary according to Iwai et al.

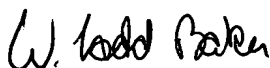
Thus, Iwai et al are not believed to anticipate or render obvious the claimed invention when considered alone or in combination with Kondou et al.

Regarding Claims 19 and 36, Applicants respectfully point out that the Office Action fails to address any of the features of those to apparatus claims. Hence, the rejection of Claims 19, 36 and their respective dependents is hereby traversed.

Consequently, in view of the present amendment, no further issues are believed to be outstanding in the present application, and the present application is believed to be in condition for formal allowance. An early and favorable action is therefore respectfully requested.

Respectfully submitted,

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Serial No: 09/774,621

Amendment Filed on: Jan 14, 2003

IN THE CLAIMS

--1. (Amended) A deterioration diagnosis method, comprising the steps of:
formulating a corrosion loss of a metallic material to exposure days under an atmospheric condition as a function [for] of environmental assessment points which [represents] represent a level of harmfulness of said atmospheric condition; and
diagnosing a life span of said metallic material based upon said corrosion loss calculated by using said function.

2. (Amended) A deterioration diagnosis method, comprising the steps of:
formulating a corrosion speed of a metallic material under an atmospheric condition as a function [for] of environmental assessment points which [represents] represent a level of harmfulness of said atmospheric condition; and
diagnosing a life span of said metallic material based upon said corrosion speed calculated by using said function.--